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(54) Flexible and rollable sheet material

(57) A sheet 1 of reinforced material which is flexible and rollable, comprising a non-woven sheet 2, in the embodiment shown of paper, combined with a scrim 3 of glass fibre strands or yarns woven with a Leno weave in which there are two strands or yarns 5 in the warp direction and one in the weft. The reinforced material can be used in underslating felt.

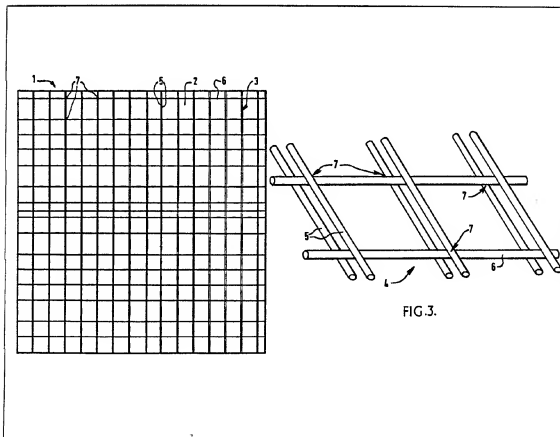
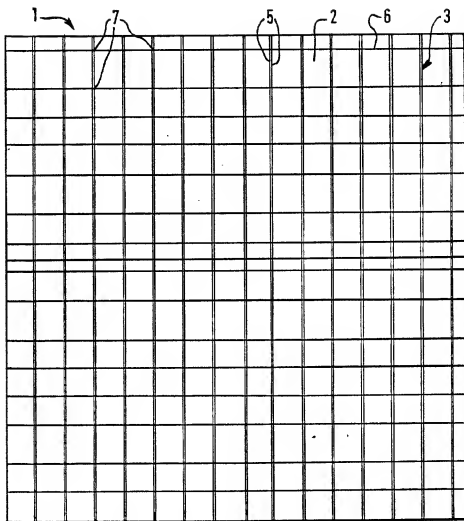


FIG. 3.

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1/2



2/2

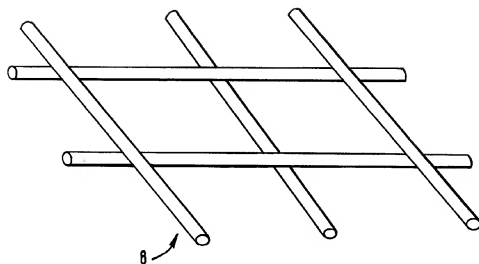


FIG. 2.

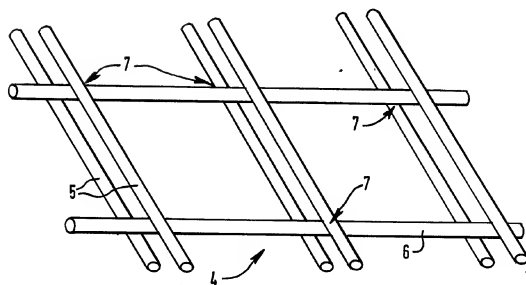


FIG. 3.

## SPECIFICATION

## Flexible and rollable sheet material

## 5 TECHNICAL FIELD OF THE INVENTION

The invention relates to flexible and rollable sheet material which is reinforced.

## BACKGROUND ART

- 10 Sheet material is often used in building operations as underlating felts and in other building operations. Such material has to be flexible, for ease of installation, and rollable as it is best handled and transported when it is
- 15 in roll form. However, in order to provide a consistent felting it has to maintain its physical integrity both during manipulation and in service. Proposed material has a tendency to break up physically, and also to deteriorate in
- 20 service because it is not strong enough. It is an object of the invention to seek to mitigate this disadvantage of proposed sheet material.

According to the invention there is provided a sheet of reinforced material which is flexible

25 and rollable, comprising a flexible and rollable non-woven material and a flexible and rollable reinforcement combined with the non-woven material to provide the sheet of reinforced material.

- 30 Using the invention it is possible to provide an underlating felt which is flexible, rollable and which maintains its physical integrity in service.

- The reinforcement may comprise a glass fibre scrim and the non-woven material may comprise a sheet with which the scrim may be combined by adhesive securing the scrim to one surface of the non-woven sheet of material. This provides a relatively simple construction which is nevertheless strong and relatively inexpensive.
- 40 non-woven material while allowing bitumen to penetrate through the interstices, for example of the scrim, to that non-woven material.

- It is to be understood that the term "scrim" used herein is taken to mean an open weave, in other words it is to be given the usual meaning it has in the weaving art.

- The reinforcement may comprise a glass fibre scrim and the non-woven material may comprise a sheet with which the scrim may be combined by adhesive securing the scrim to one surface of the non-woven sheet of material. This provides a relatively simple construction which is nevertheless strong and relatively inexpensive.

- 55 The reinforcement may comprise a network or regular arrangement of continuous glass fibre strands or yarns. The construction is useful where it is desired to have a close weave in the woven reinforcement than would be obtainable using a scrim. It will be understood also that the term "strand" used herein relates to a plurality of glass filaments bundled together by means of an adhesive and that the term "yarn" means twisted strands.
- 60 The reinforcement may comprise a network

of continuous glass fibre strands or yarns and the non-woven material may comprise a sheet with which the said network may be combined by adhesive securing the network to

70 one surface of the non-woven sheet material.

The flexible and rollable non-woven material may comprise paper. This provides a relatively inexpensive construction.

- The paper may be of a weight in the range
- 75 of about 25 gsm to 500 gsm (grams per square metre), and preferably may be of 150 gsm.

- The flexible and rollable material may be paper and the scrim may be a Leno weave
- 80 scrim and the strands or yarns in the weave of the Leno weave scrim may comprise two strands or yarns in the warp and one strand or yarn in the weft. The Leno weave may have 0.8 glass fibre strands per centimetre of 1.5
- 85 glass fibre strands or yarns per centimetre respectively in both warp and weft directions.

- The glass fibre strands or yarns in both warp and weft may be 340 or 680 decitex, or of any other suitable value to provide a reinforced sheet material which is rollable and flexible.

- As an alternative to paper, the non-woven material may comprise rag fibre, polypropylene, polyamide or polyester fibre sheet material or glass fibres, either singly or in combination with paper.

- It will also be understood that although a Leno weave has been described, a plain weave may also be used.

- The woven material may be combined with other non-woven material in the form of a sheet, such as a paper sheet by being attached to one surface of the paper by adhesive, by being sandwiched between two layers of paper which are secured together by adhesive, or may be incorporated into the body of the paper during manufacture thereof. In the latter case, a scrim of glass fibre may be fed into a paper pulp and then fed through a
- 100 sheeter to provide a sheet of paper in which the scrim is incorporated.

- Where an adhesive is used, the adhesive should be resistant to short-term contact with but bitumens but flexible enough for the finished reinforced sheet to be flexible and rollable. Whichever form is used, the non-woven and woven materials are firmly bonded together and do not become separated.

- The scrim may be sandwiched between two layers of paper and bonded to each of them although the layers of paper are not directly stuck to one another.

- According to a second aspect of the invention there is provided an under-lating felt comprising a sheet of material as hereinbefore defined, which may be coated with bitumen and may be surfaced with a release agent.

- A sheet of reinforced material which is flexible and rollable, embodying the invention, is hereinafter described, by way of example,

with reference to the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

*Figure 1* is a plan view of part of a sheet of reinforced material which is flexible and rollable;

*Figure 2* is an enlarged perspective view of a plain weave scrim; and

*Figure 3* is an enlarged perspective view of a Leno weave scrim.

Referring to the drawings, (Fig. 1), the sheet of reinforced flexible and rollable material 1 comprises a non-woven material in the form of a sheet of paper 2 which is combined with a woven material in the form of a glass fibre scrim 3. The scrim 3 has a Leno weave 4 (Fig. 3) there being two strands or yarns 5 in the warp and one 6 in the weft. The scrim 3 is secured to the paper by adhesive applied at at least the points of intersection 7 of the respective strands or yarns of the warp or weft, though preferably, and in the embodiment shown in Fig. 1, the scrim 3 is bonded to the paper 2 along the whole length of the strands or yarns 5 and 6.

The adhesive is resistant to short-term contact with hot bitumen so that the bond between the scrim 3 and the paper 2 is not impaired when the laminate is coated with hot bitumen to make an underslating felt.

In order to make an underslating felt, the laminate shown in Fig. 1 is covered preferably on both sides with hot bitumen without detriment, the bitumen having a temperature in the range 130°C to 220°C, typically 160°C to 200°C, and can also withstand prolonged contact with bitumen without detriment. The bitumen may be unfilled, or it may be filled with suitable material. Also, the exposed surface or surfaces of the bitumen may be surfaced with any suitable inert powdered material forming a release agent, such as sand, talc, crushed limestone or the like. Further, the bitumen may be oxidised bitumen.

The paper sheet 2 shown is of 150 gsm (grams per square metre) and the Leno weave has 0.8 glass fibre strands or yarns per centimetre in both warp and weft direction, the strands or yarns being 340 decitex.

Although a Leno weave 4 has been described, a plain weave 8 as shown in Fig. 2 may be used.

#### CLAIMS

1. A sheet of reinforced material which is flexible and rollable, comprising a flexible and rollable non-woven material and a flexible and rollable reinforcement combined with the non-woven material to provide the sheet of reinforced material.

2. A sheet according to Claim 1, the reinforcement comprising a glass fibre scrim.

3. A sheet according to Claim 1, the reinforcement comprising a glass fibre scrim and the non-woven material comprising a sheet

with which the scrim is combined by adhesive securing the scrim to one surface of the non-woven sheet material.

4. A sheet according to Claim 1, the reinforcement comprising a network of continuous glass fibre strands or yarns.

5. A sheet according to Claim 1, the reinforcement comprising a network of continuous glass fibre strands or yarns and the non-woven material comprising a sheet with which the network is combined by adhesive securing the network to one surface of the non-woven sheet material.

6. A sheet according to any preceding Claim, the flexible and rollable non-woven material comprising paper.

7. A sheet according to Claim 6, the paper being paper having a weight in the range of about 25 gsm to 500 gsm (grams per square metre).

8. A sheet according to Claim 7, the paper being of 150 gsm.

9. A sheet according to Claim 2 or Claim 3, the flexible and rollable non-woven material being paper and the scrim being a Leno weave scrim.

10. A sheet according to Claim 9, the Leno weave comprising two strands or yarns in the warp and one strand or yarn in the weft.

11. A sheet according to Claim 9 or Claim 10, the Leno weave having 0.8 glass fibre strands or yarns per centimetre in both the warp and weft direction.

12. A sheet according to Claim 9 or Claim 10, the Leno weave having 1.5 glass fibre strands or yarns per centimetre in both warp and weft directions.

13. A sheet according to Claim 11 or Claim 12, the glass fibre strands or yarns in both warp and weft being 340 decitex.

14. A sheet according to Claim 11, the glass fibre strands or yarns in both warp and weft being 680 decitex.

15. A sheet according to any of Claims 1 to 6, the non-woven material comprising rag fibre, polypropylene, polyamide or polyester fibre sheet material or glass fibres.

16. A sheet of reinforced material which is flexible and rollable, substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

17. An underslating felt, comprising a sheet of material according to any preceding Claim and a bituminous layer bonded thereto.

18. An underslating felt according to Claim 17, in which the bituminous layer comprises filled oxidised bitumen surfaced with a release agent.

19. An underslating felt according to Claim 18, the release agent comprising sand.

20. An underslating felt comprising a sheet according to Claim 1, substantially as hereinbefore described.

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